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ABSTRACT

A variety of research findings and observations concerning learning styles are compiled in this guide to help teachers understand the implications of their students' learning preferences. The first section describes the Learning Preference Inventory (LPI) as an instrument that asks the student to select among eight learning situations, e.g., lecture, tutoring, group learning, the one preferred for different types of learning activities. LPI results are reported for the following groups: American Samoan, Fort Belknap Reservation Indians, Iranian, Caucasian Alaskan, and Native Alaskan. Most groups consisted of Adult Basic Education students, but preschool, elementary, and secondary students were also studied. The second section describes the Learning Style Inventory (LSI), which analyzes learning preferences according to environmental, emotional, sociological, physical, and psychological factors. LSI results are reported for Iranian, Southeast Alaskan, and Southwest Alaskan groups. The third section summarizes 16 learning style studies concerned with bilingual students and environmental and physical factors. The final section presents a chart showing preferred learning styles for 10 student categories: independent and dependent, high and low self-concept, upper and lower grade levels, high and low reading achievement, and high and low mathematics achievement. (JHZ)

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LEARNING STYLES

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LEARNING STYLES

A primary teacher at my school reports:

"I have a student who always goes to sit on the window side of our room. Even when her group gathers on the floor in a circle, she sits as near the window as possible. She doesn't look out the window but seems to go to the light. I notice that on dark dreary days, she does not do this. When she is made to sit elsewhere, to work with the aide or to do some seatwork, she doesn't do well in her classwork."

Concerning another student, the same teacher says:

"Arnie just cannot sit still. He is always up out of his seat and moving about the room. He is not noisy or disruptive, but whenever we start to do a lesson or paperwork, he is up leaning against the table or going to the pencil sharpener two or three times in a few minutes. When I try to get him to settle down, he withdraws. Otherwise, he is a good student."

My high school Home Ec teacher said:

"My sewing students want to play music cassettes during sewing class. Is there any objection?"

After a few days of music in the class, she reported:

"On the second day of playing the cassettes, most of the class complained that the music distracted them and they couldn't do their work. One student tried to dominate the class by saying that she really liked the music and did better work when there was music in the room. I let her have the cassette player near her station and told her to keep the volume very low. Everyone seems to be satisfied."

These are some obvious examples of possible concerns about students' learning styles which is defined as:

"the way that students' abilities to absorb and retain information and concepts and to learn and master skills are affected by various environmental, emotional, sociological, physical, and psychological elements."

I intend to present for your information some research and experiential findings concerning learning styles and to have you understand the implications of knowing about students' learning styles.

LEARNING PREFERENCE INVENTORY (LPI)

The LPI was developed by Manzo, Lorton, and Stein in the early seventies at the University of Missouri-Kansas City to discover how individual students prefer to learn several of the different types of things required by schools; tasks, skills, and knowledge. The wording of the test and the accompanying pictures makes it applicable to students from primary grades through adult levels.

Eight types of learning situations are pictured on 4x6 cards and each method of learning is explained to the student. Some of the ways to learn are variations on individualized work; others involve two or more persons.

Once students understand each style of learning, they are shown six different kinds of situations---two for each of three learning objectives. The learning objective "tasks" is represented by the need to learn how to do a complicated workbook exercise and how to play a new game. The "skills" objective is represented by the learning of basic arithmetic and reading. The "knowledge" objective is represented by the need to acquire and retain information in Science and Social Studies.

Scoring of the LPI is done by recording and counting student expressed preferences. Interpretation must take many more factors into account than are assessed by the inventory. But the essential objective is best understood as an effort to meet students' preferred styles of learning and to systematically work to enhance their repertoires to include other learning modes.

GROUPS TESTED

The original groups studied were Adult Basic Education (ABE) students. Subsamples tested, to obtain a perspective for the interpretation of results, included children in the middle grades of parochial and public elementary schools.

In 1974, the ABE students of American Samoa, composed of American and Western Samoans, Tongans, Koreans, and Japanese, all of whom were English as Second Language (ESL) students, were tested. The LPI was also administered to students from Early Childhood Education (ECE) classes through secondary school. These were small samples from a variety of schools.

In 1978, elementary students at the Fort Belknap Reservation in Montana were tested. These students were Gros Ventre and Asseneboine Indians.

In 1979, the students of the Rastakhiz International Schools in Tehran, Iran (a private bilingual school system 95% Iranian, 5% Armenian,European,and American) were tested.

In 1981, approximately 75% of the junior-senior high school students of Prince of Wales School in southeast Alaska were tested.

In 1984, the students at Togiak School in southwestern Alaska are being tested and results based on a small random sample are being reported.

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FINDINGS

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***** Original ABE group: In general, they leaned consistently toward preferring lecture, tutoring, and group learning.

TASKS: If a learning task, such as doing a complicated workbook exercise, was required, 25% favored group learning. Less than 20% of the remaining sample chose lecture or tutoring.

SKILLS: For learning reading and math skills, 33% chose tutoring, 21% chose lecture, 10% chose group learning.

KNOWLEDGE: For learning and remembering facts, 30% chose lecture, 18% chose group, and 16% chose tutoring.

***** American Samoan group: In general, they also leaned consistently toward preferring tutoring, group, and lecture with an additional preference for machine learning. The ABE students and the public school students are reported separately.

ABE STUDENTS

TASKS: 25% group; 20% tutor.
SKILLS: 35% tutor; 25% lecture.
KNOWLEDGE: 35% group; 20% machine; 15% lecture.

PUBLIC SCHOOL STUDENTS

TASKS: 38% group; 21% tutor; 17% lecture.
SKILLS: 38% group; 26% tutor; 13% lecture.
KNOWLEDGE: 52% lecture; 22% tutor; 20% group.

****** Fort Belknap group: In general, they preferred to either work in a group, with a tutor, or in an unstructured individual setting.

TASKS: 42% group; 30% tutor; 24% unstructured.
SKILLS: 46% group; 26% unstructured; 23% tutor.
KNOWLEDGE: 79% group; 16% tutor.

***** Iranian group: The Iranian group was tested in both Farsi, their native language, and English, their other language of instruction. Most students spoke three to five languages fluently. Their preferences changed radically between their native language and English.

TESTED IN ENGLISH

TASKS: 46% group; 32% tutoring.
SKILLS: 47% group; 31% tutoring.
KNOWLEDGE: 31% lecture; 30% tutoring.

TESTED IN FARSI

TASKS: 52% lecture; 40% tutoring.
SKILLS: 40% group; 35% tutoring.
KNOWLEDGE: 81% lecture; 15% tutoring.

***** Alaskan group: The Alaskan group was 60% caucasian and 40% Tlingit and Haida. Their scores are reported separately as they were consistent within their groupings.

CAUCASIAN STUDENTS

TASKS: 38% group; 22% lecture; 20% machine.
SKILLS: 26% group; 25% lecture; 19% tutoring.
KNOWLEDGE: 32% lecture; 21% group; 19% tutoring.

NATIVE STUDENTS

TASKS: 48% group; 32% unstructured.
SKILLS: 78% group; 12% unstructured.
KNOWLEDGE: 78% group; 12% unstructured.

****** Togiak group: The Togiak group is 99% Yup'ik. According to the most recent Language Assessment Survey conducted by the Southwest Region Schools Bilingual/Bicultural Education Program, 24% speak Yup'ik exclusively, 50% speak mostly Yup'ik with some English, 12% speak Yup'ik and English with equal ease, 9% speak mostly English with some Yup'ik, and 5% speak English exclusively but whose manner of speaking reflects the grammatical structure of another language...often called "village English." Scores for the Togiak group were kept separately for grades 1-6 and 7-12.

GRADES 1-6

TASKS: 16% group; 16% lecture; 14% machine.
SKILLS: 28% lecture; 21% tutor; 13% unstructured.
KNOWLEDGE: 19% lecture; 15% tutor; 14% discovery.

GRADES 7-12

TASKS: 29% tutor; 21% lecture; 13% group.
SKILLS: 29% lecture; 21% machine; 17% tutor.
KNOWLEDGE 38% lecture; 21% machine; 13% tutor.

******* In March, 1985, Levelock School administered the LPI to their students with the following results.

Grades 9-12 (6 students)

TASKS: 42% Tutoring; 33% Lecture; 25% Group
SKILLS: 50% Lecture; 34% Tutoring; 8% Group
KNOWLEDGE: 34% Lecture; 25% Unstructured; 17% Group

Grades 2-4 (7 students)

TASKS: 50% Tutoring; 21% Lecture
SKILLS: 36% Unstructured; 21% Tutoring
KNOWLEDGE: 50% Lecture; 21% Machine

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LEARNING STYLE INVENTORY (LSI)

Rita and Kenneth Dunn's Learning Style Inventory diagnoses an individual student's learning style. An early version analyzed the conditions under which students prefer to learn in the areas of environmental, emotional, sociological, and physical stimuli and conditions. A later version added psychological stimuli and conditions. Both forms of the LSI have been used successfully and it is, no doubt, the most widely used learning styles assessment instrument currently available.

The LSI is a pamphlet of 104 statements about how the subject likes to learn. The earlier self-report form was answered True or False and gave scores in immediate environment (sound, light, temperature, and design), emotionality (motivation, persistence, responsibility, and structure), sociological needs (self-oriented, peer-oriented, adult-oriented, or combined ways), and physical needs (perceptual preferences, food intake, time of day, and mobility). The newer form uses a Likert-type scale with responses ranging from Strongly Agree to Strongly Disagree and adds the psychological dimension (analytical/global, field independent/field dependent, and hemispheric dominance).

GROUPS TESTED

The three groups inventoried with the LSI are the Iranian, Southeast Alaskan, and the Southwest Alaskan. These groups are described above.

FINDINGS

(Note: Only those elements with significant scores are reported for the Iranian group).

****** IRANIAN GROUP: The Rastakhiz school system divided the day into English Language/Western studies and Farsi Language/Persian-Islamic studies. Students were tested for each language and culture.

TESTED FOR ENGLISH/WESTERN STUDIES

ENVIRONMENTAL

SOUND: Majority prefer a quiet environment.
LIGHT: Majority prefer dim light.
TEMPERATURE Almost all prefer warmth.

EMOTIONAL

MOTIVATION: Almost all are highly motivated. Younger students are both self and teacher motivated. Older students are teacher motivated.
PERSISTENCE: Majority are persistent.
RESPONSIBILITY: Majority are responsible.

SOCIOLOGICAL

SELF: Many of the older students prefer to work alone. Younger students prefer NOT to work alone.

PEER: Many students want to work with one peer.

PEERS: Majority of younger students prefer to learn with a small group of peers.

ADULT: Almost all prefer the presence of an adult.

PHYSICAL

VISUAL: Almost all have a high preference for visual learning.

TIME: Early morning and afternoons are preferred. Late mornings are least preferred.

MOBILITY: Younger students do not need mobility.

TESTED FOR FARSI LANGUAGE/PERSIAN-ISLAMIC STUDIES

ENVIRONMENT

SOUND: Many younger students and most older students want quiet.

LIGHT: Majority prefer dim light.

DESIGN: Almost all prefer formal design.

EMOTIONAL

MOTIVATION: Almost all are highly motivated. Majority are adult or teacher motivated. Many are self motivated.

PERSISTENCE: Almost all are persistent.

RESPONSIBILITY: Almost all are responsible.

STRUCTURE: About half desire an imposed structure; about half want little or no structure.

SOCIOLOGICAL

PEERS: Almost all younger students are peer-oriented. Most older students are NOT peer-oriented.

ADULTS: Most younger students want adult present. Almost all older students do NOT want adult present.

VARIED: Majority prefer to learn in several ways.

PHYSICAL

VISUAL: Majority prefer visual learning.

TIME: Almost all prefer early morning and afternoon. Almost all do NOT like late morning.

MOBILITY: Almost all need mobility.

***** ALASKAN GROUP: This group of Southeast Alaska students were a mixture of Tlingit, Haida, and Caucasians most of whom were born in the area or lived there most of their lives. About 10% were from outside. High achievers were found in each group and this report first describes high achievers and then the balance of the students.

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ENVIRONMENTAL

SOUND: 70% quiet: 30% not a factor
LIGHT: 50% dim: 40% not a factor: 10% bright
TEMPERATURE: 50% warm: 30% not a factor; 20% cool
DESIGN: 50% formal: 30% not a factor: 20% informal

EMOTIONAL

MOTIVATION: 70% self: 20% adult; 10% teacher
PERSISTENCE: 80% persistent; 20% not a factor
RESPONSIBILITY: 80% responsible; 20% not a factor
STRUCTURE: 60% not a factor; 30% little; 10% lots

SOCIOLOGICAL

SELF: 50% study alone; 50% not a factor
PEER: 100% not a factor
PEERS: 80% small group; 20% not a factor
ADULT: 100% not a factor
VARIED: 70% learn many ways; 30% not a factor

PHYSICAL

PERCEPTUAL: 40% visual; 20% visual & auditory; 20% kinesthetic; 20% not a factor
INTAKE: 80% not a factor; 10% yes; 10% no
TIME: 80% n.g. in late morning; 20% not a factor
MOBILITY: 50% need; 30% not a factor; 20% no need

BALANCE OF STUDENTS

ENVIRONMENTAL

SOUND: 88% not a factor; 10% quiet; 2% noise
LIGHT: 82% not a factor; 14% bright; 4% dim
TEMPERATURE: 93% not a factor; 7% warm
DESIGN: 75% not a factor; 20% formal; 5% informal

EMOTIONAL

MOTIVATION: 62% not a factor; 29% self; 9% adult or teacher
PERSISTENCE: 61% not a factor; 34% not; 5% yes
RESPONSIBILITY: 87% not a factor; 9% not; 4% yes
STRUCTURE: 85% not a factor; 11% no; 4% yes

SOCIOLOGICAL

SELF: 69% not a factor; 21% cannot learn alone; 10% can
PEERS: 56% not a factor; 40% prefer peers; 4% not

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ADULT: 56% not a factor: 38% prefer adult presence: 6% not

VARIED: 62% not a factor: 30% yes: 8% no

PHYSICAL

PERCEPTUAL: 48% not a factor; 23% visual; 11% auditory; 11% tactile/kinesthetic: 4% kinesthetic; 3% visual/auditory

INTAKE: 68% not a factor; 32% require

TIME: 60% not a factor: 18% afternoon n.g.; 12% prefer early morning; 10% late morning n.g.

MOBILITY: 53% not a factor; 44% no; 3% yes

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****** SOUTHWEST ALASKA (Iugiak School): Iogiak students have been tested using the latest LSI instrument. Each item is reported as the PREFERRED or PRESENT learning mode. Only the preferred percentages are listed. The "not a factor" percentages are indicated by the difference between numbers presented and 100. Percentages have been rounded off to the nearest whole number.

In 1983, 72 students from grades 4-12 were tested. Two years later, they wre retested.

1983

NOISE LEVEL:	Quiet 15%	Sound Present 3%
LIGHT:	Bright 12%	Dim 7%
TEMPERATURE:	Cool 5%	Warm 1%
DESIGN:	Formal 24%	Informal 9%
MOTIVATION:	Unmotivated 34%	Motivated 19%
PERSISTENCE:	Are Not 31%	Are 9%
RESPONSIBLE:	Are Not 11%	Are 4%
STRUCTURE:	High 15%	Low 9%
LEARN ALONE/PEER ORIENTED:	Yes 24%	No 19%
AUTHORITY FIGURE PRESENT:	Yes 23%	No 7%
LEARN IN SEVERAL WAYS:	Yes 27%	No 14%
AUDITORY:	No 23%	Yes 7%
VISUAL:	No 16%	Yes 11%
TACTILE:	No 16%	Yes 7%
KINESTHETIC:	No 20%	Yes 11%
REQUIRES INTAKE:	No 49%	Yes 1%
EVENING-MORNING:	Yes 16%	No 4%
LATE MORNING:	Yes 16%	No 11%
AFTERNOON:	No 24%	Yes 7%
NEEDS MOBILITY:	No 35%	Yes 4%
PARENT FIGURE MOTIVATED:	No 49%	Yes 16%
TEACHER MOTIVATED:	No 43%	Yes 16%

1985

NOISE LEVEL:	Quiet 22%	Sound Present 3%
LIGHT:	Dim 12%	Bright 10%
TEMPERATURE:	Warm 14%	Cool 7%
DESIGN:	Formal 28%	Informal 17%
MOTIVATION:	Unmotivated 28%	Motivated 22%
PERSISTENCE:	Are Not 30%	Are 17%
RESPONSIBLE:	Are Not 11%	Are 10%
STRUCTURE:	High 15%	Low 15%
LEARN ALONE:	Yes 24%	No 22%
AUTHORITY FIGURE PRESENT:	Yes 36%	No 7%
LEARN IN SEVERAL WAYS:	Yes 30%	No 14%
AUDITORY:	No 42%	Yes 7%
VISUAL:	Yes 18%	No 14%
TACTILE:	No 16%	Yes 16%
KINESTHETIC:	No 20%	Yes 11%
REQUIRES INTAKE:	No 53%	Yes 6%
EVENING-MORNING:	Yes 21%	No 5%
LATE MORNING:	No 21%	Yes 12%
AFTERNOON:	No 24%	Yes 12%
NEEDS MOBILITY:	No 30%	Yes 2%
PARENT FIGURE MOTIVATED:	No 42%	Yes 22%
TEACHER MOTIVATED:	Yes 38%	No 32%

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RESEARCH FINDINGS

BILINGUAL STUDENTS

Cohen (1969): bilingual students learn best in their mother tongue and achieve most easily when taught in a manner that complements their learning style.

Goodman (1970) and Ramirez and Castenada (1974): learning style emerges from one's linguistic-cultural upbringing.

Saville and Troicke (1971): a mismatch of the language of instruction and the dominant language of the student can lead to failure or frustration in learning, as well as diminished self-concept.

Lambert, Hamers, and Frasure-Smith (1979): children raised in the same cultural environment exhibit certain similar ways of relating and adjusting.

ENVIRONMENTAL

Pizzo (1981) identified sixth graders' preferences for quiet versus sound when concentrating and tested for reading comprehension skills and attitudes. Students achieved significantly higher (.01) when classrooms were responsive to their styles; they achieved significantly lower when the setting was dissonant.

Schmeck and Lockhart (1983): inherited differences in the ways in which people's nervous systems function require that some learn in a stimulating environment while others must have quiet, calm and few distractions.

Krimsky (1983) identified fourth graders' preferences for either bright or low light and tested them in two types of carefully designed, extremely different, illuminated environments. Statistical procedures documented that each group performed significantly better (.001) when matched; both performed significantly less well when mismatched.

Murrain (1983) investigated seventh graders who evidenced preferences for either warm or cool temperatures. The data documents higher performance (.10) by matched groups. Nearly four times as many students preferred a warm room in which to learn.; even the non preferenced students attained higher scores on the test in a warm setting.

Shea (1983) identified ninth graders who preferred learning in conventional seats and desks (formal design) and those who indicated that they would achieve better on carpeting, a lounge chair, pillows, or the floor (informal design). He tested both groups' English comprehension skills in a traditional and an informal setting. Tests scores revealed that both groups performed statistically better (.001) when matched correctly with their preferences and both achieved statistically less well in the mismatched condition.

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White. Dunn, and Zenhausern (1982): less responsible and persistent students did not learn through conformity; they achieved better through self-selected options.

PHYSICAL

Weinberg (1983) identified perceptual strengths of 69 third grade arithmetic students identifying auditory and visual modality preferences. They were taught a subtraction unit through instructional materials that either complemented or were dissonant from their revealed preferences. Students performed significantly better (.05) when taught through complementary strategies.

Carruthers and Young (1978) took math junior high underachievers who preferred learning in the afternoon, but had been in morning classes. and reassigned them to afternoon math classes. They became better disciplined, more motivated, and produced a trend toward statistically improved avhievement.

Lynch (1981) analyzed eleventh and twelfth grade students identified as initial or chronic truants and matched their time of day preferences. Truancy patterns were reversed.

Virostko (1983) matched and mismatched 286 elementary students for time of day preferences in math and reading. Congruent matches achieved significantly higher (.001) than those who were not matched.

Ross (1984) compared the achievement scores of two general math classes. One taught in mid-morning (preferred by students) and the other in late morning (just before lunch, not preferred by students). The early class averaged a B grade; the later class averaged C-.

Della Valle (1984) tested all the seventh graders in a large, New York junior high school to identify their mobility preferences. Fully half the population evidenced strong mobility needs when concentrating. All students were taught and evaluated in situations that required them to remain seated while learning and being tested. Each group achieved statistically higher scores (.001) in congruent conditions than in the settings that were incongruent with their diagnosed learning styles.

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LEARNING STYLES

WHAT RESEARCH TELLS US

WHEN STUDENTS ARE MATCHED WITH THEIR PREFERRED LEARNING STYLES, THEY ACHIEVE SIGNIFICANTLY BETTER.

INDEPENDENT STUDENTS	DEPENDENT STUDENTS
* function best in modern schools	* function best in traditional schools
* high reading level	* low reading level

HIGH SELF-CONCEPT STUDENTS	LOW SELF-CONCEPT STUDENTS
* prefer quiet	* prefer sound
* prefer warm environment	* prefer cool environment
* prefer to work alone or with peers	* want adult presence
* have visual preference	* have auditory preference
* learn in several ways	
* adult/teacher motivated	* not adult/teacher motivated
* are persistent in study	* are not persistent in study
* need little mobility	* need mobility
* high academic achievers	* low academic achievers

UPPER GRADE LEVELS	LOWER GRADE LEVELS
* less teacher-motivated	* more teacher-motivated
* less persistent	* more persistent
* less tactile	* more tactile
* less work in morning	

HIGH READING ACHIEVEMENT	LOW READING ACHIEVEMENT
* prefer low light	* prefer bright light
* prefer formal design	* prefer informal design
* self-motivated	* NOT self-motivated
* NOT adult-motivated	* adult-motivated
	* are unmotivated
* are persistent	* are NOT persistent
* are responsible	* are NOT responsible
* do NOT prefer t/k senses	* prefer t/k senses
* do NOT prefer food intake	* prefer food intake
* do NOT function best late a.m.	* function best in late a.m.
* need mobility	* do NOT need mobility

HIGH MATH ACHIEVEMENT	LOW MATH ACHIEVEMENT
* prefer formal design	* prefer informal design
* NOT adult-motivated	* adult-motivated
* are persistent	* are NOT persistent
* are responsible	* are NOT responsible
* NOT peer-oriented	* prefer to study with peers
* do NOT require food intake	* require food intake
* do NOT function best late a.m.	* function best in late a.m.
* need mobility	* do NOT need mobility

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